

09/762,923

Priority to 8-13-1998

IN THE CLAIMS

Please amend the status of the claims to that as indicated as follows:

Claims 1-17 (canceled)

09/723

18. (currently amended) A method of ~~—SaO₂—~~ SO₂ monitoring ~~—which comprises measuring—~~ comprising the steps of calculating an estimate of SO₂ in blood to be monitored and —adding— correcting by a scaling factor, [[Δ.]]

Claims 19-34 (canceled)

35. (new) The method of SO₂ monitoring according to Claim 18, further comprising the steps of:

transmitting light containing a plurality of wavelengths into the blood;

measuring a remitted spectrum over the plurality of wavelengths;

calculating a measured blood absorption spectrum from the remitted spectrum;

estimating local rates of change in the measured blood absorption spectrum at a plurality of the wavelengths, including at least one isobestic wavelength; and,

calculating the estimate of SO₂ as a function of absolute values of the local rates of change of the measured blood absorption spectrum.

-5-

PaO₂ pressure

SO₂ saturation

CaO₂ content

in use with oxygen
Edwin Schindler
18 Schindler
sub

4/16/2001

sub 310
600/323 Comb

331

sub

Carboxyhemoglobin

36. (new) The method of SO_2 monitoring according to Claim 35, wherein before said step of calculating the estimate of SO_2 , further comprising the steps of:

removing effects of light scattering from the measured blood absorption spectrum;

calculating an area under the measured blood absorption spectrum after the step of removing effects of light scattering; and,

normalizing the measured blood absorption spectrum by the area under the measured blood absorption spectrum determined during the step of calculating.

37. (new) The method of SO_2 monitoring according to Claim 35, further comprising the step of applying a Kubelka Monk transformation to the measured blood absorption spectrum.

38. (new) The method of SO_2 monitoring according to Claim 35, wherein the step of calculating the estimate of SO_2 comprises the steps of:

computing a hemoglobin index value as a function of absolute values of the local rates of change of the measured blood absorption spectrum between a plurality of pairs of isobestic points, whereby the hemoglobin index value is independent of blood oxygenation;

computing an oxygenation parameter as a function of absolute values of the local rates of change of the measured

blood absorption spectrum between a plurality of isobestic points and at least one non-isobestic point, whereby the oxygenation parameter is dependent on blood oxygenation;

normalizing the oxygenation parameter by the hemoglobin index value; and,

estimating SO_2 as a measure of the level of the normalized oxygenation parameter relative to a predetermined fully deoxygenated reference value and a fully oxygenated reference value.

39. (new) The method of SO_2 monitoring according to Claim 35, further comprising the steps in the order of:

transmitting light containing a plurality of wavelengths into the blood;

measuring the remitted spectrum over the plurality of wavelengths;

calculating the measured blood absorption spectrum from the remitted spectrum;

estimating the local rates of change in the measured blood absorption spectrum at a plurality of the wavelengths, including at least one isobestic wavelength; and,

calculating the estimate of SO_2 as a function of absolute values of the local rates of change of the measured blood absorption spectrum.

Comb 40. (new) A method for monitoring oxygenation of blood, comprising the steps of:

transmitting light containing a plurality of wavelengths into blood;

measuring a remitted spectrum over the plurality of wavelengths;

calculating a measured blood absorption spectrum from the remitted spectrum;

estimating local rates of change in the measured blood absorption spectrum at a plurality of the wavelengths, including at least one isobestic wavelength; and,

calculating an estimate of SO_2 as a function of absolute values of the local rates of change of the measured blood absorption spectrum.

41. (new) The method for monitoring oxygenation of blood according to Claim 40, wherein the plurality of wavelengths used in the step of estimating local rates of change in the measured blood absorption spectrum include at least five isobestic wavelengths.

42. (new) The method for monitoring oxygenation of blood according to Claim 40, wherein the plurality of wavelengths lie in a range of 500 - 600 nm.

43. (new) The method for monitoring oxygenation of blood according to Claim 40, further comprising the step of:
applying a Kubelka Monk transformation to the measured blood absorption spectrum.

44. (new) The method for monitoring oxygenation of blood according to Claim 40, comprising the steps in the order of:

transmitting light containing a plurality of wavelengths into the blood;

measuring the remitted spectrum over the plurality of wavelengths;

calculating the measured blood absorption spectrum from the remitted spectrum;

estimating local rates of change in the measured blood absorption spectrum at a plurality of the wavelengths, including at least one isobestic wavelength; and,

calculating an estimate of SO_2 as a function of absolute values of the local rates of change of the measured blood absorption spectrum.

Cont

45. (new) A method for monitoring oxygenation of blood comprising the steps of:

determining a first reference spectrum over a plurality of wavelengths;

determining a second reference spectrum over the plurality of wavelengths;

transmitting light containing the plurality of wavelengths into blood;

measuring a remitted spectrum over the plurality of wavelengths;

calculating a measured blood absorption spectrum as a

function of the remitted spectrum, the first reference spectrum and the second reference spectrum; and,

removing effects of light scattering from the measured blood absorption spectrum by a removing effects method comprising the steps of:

calculating a correction function that is a function of a plurality of isobestic points of the measured blood absorption spectrum;

correcting the measured blood absorption spectrum by the correction function;

normalizing the measured blood absorption spectrum following the correcting step;

calculating an optimal spectrum as a function of a substantially oxygenated reference absorption spectrum and a substantially deoxygenated reference absorption spectrum, so that the optimal spectrum best matches the measured blood absorption spectrum in a predetermined sense; and,

calculating an estimate of SO_2 as a function of the optimal spectrum.

46. (new) The method for monitoring oxygenation of blood according to Claim 45, wherein the step of normalizing the measured blood absorption spectrum following the correcting step of said removing effects method comprises the steps of:

determining an area under the measured blood absorption

spectrum; and,

dividing the measured blood absorption spectrum by a function of the area.

47. (new) The method for monitoring oxygenation of blood according to Claim 45, wherein the correction function is linear.

48. (new) The method for monitoring oxygenation of blood according to Claim 45, wherein the correction function is a function of two isobestic points of the measured blood absorption spectrum.

49. (new) The method for monitoring oxygenation of blood according to Claim 48, wherein the correction function is a line that passes through the two isobestic points.

50. (new) The method for monitoring oxygenation of blood according to Claim 49, wherein the two isobestic points are at 522 nanometers and 586 nanometers, respectively.

51. (new) The method for monitoring oxygenation of blood according to Claim 45, wherein the first reference spectrum is a spectrally neutral "white" spectrum and the second reference spectrum represents an ambient "dark" spectrum.